

Date: Wednesday, 4/4/2007 8:58:40 AM
 User: Kim Johnston

Process Sheet

Customer	CU-DAR001 Dart Helicopters Services	Drawing Name	X-TUBE 412		
Job Number	31595	Part Number	D412664145		
Estimate Number	12783	Drawing Number	D412-664-145 U/R		
P.O. Number	<i>M</i>	Project Number	N/A		
This Issue	4/4/2007	Drawing Revision	U/R		
Prsht Rev.	NC	Material	<i>N/A</i>		
First Issue	<i>M</i>	Due Date	4/30/2007	Qty:	1
Previous Run	31594	Um:	Each		
Written By	<i>07/04/04</i>				
Checked & Approved By	<i>07/04/04</i>				
Comment	Est Rev. A New Issue 07-02-14 JLM				

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :	
1.0	DC	DOCUMENT CONTROL	
		Comment: Photocopy bluefile & type labels per PPPD412-664-105	<i>N/A</i>
2.0	D6019128	Crosstube Material	
		Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)	
		Pick: Qty Part number Description Batch 1 D6019-128 Crosstube <u>309369</u>	
		Check OD = 2.7500", ID =	<i>2.7500" 07/04/12</i>
3.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE	
		Comment: MORI SEIKI CNC LATHE LARGE	
		Turn as per Dwg D412-664-145	<i>2.7500" 07/04/12</i>
4.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE	
		Comment: INSPECT PARTS AS THEY COME OFF MACHINE	<i>MB 07/04/12</i>
5.0	QC8	SECOND CHECK	
		Comment: SECOND CHECK	<i>MB 07/04/12</i>
6.0	LANDING GEAR 1	LANDING GEAR RESOURCE 1	
		Comment: LANDING GEAR RESOURCE 1	
		1-Polish entire outside surface of crosstube	<i>Jb 7-4-20</i>

W/O:

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 4/4/2007 8:58:40 AM

User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 31595

Part Number: D412664145

Job Number:



Seq. #: Machine Or Operation:

Description :

7.0 QC5

INSPECT WORK TO CURRENT STEP



DP 2-4-20

Comment: INSPECT WORK TO CURRENT STEP

8.0 HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

JB 7-4-20

9.0 QC3/5

INSPECT WORK/WING WALK



Comment: Inspect work & Chemical conversion Coat

BE 6705-02

10.0 BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D412-664-145 using CNC bender program

11 7-5-23

11.0 QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

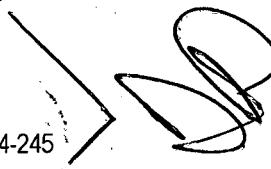
LANDING GEAR RESOURCE 1

12.0 LANDING GEAR 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D412-664-245



7-5-15

2-Ream hole to finish size in tube as per Dwg D412-664-245

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-245

JB 7-5-15

13.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat Tube as per QSI 005 4.1

JB 7-5-15

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services		Drawing Name: X-TUBE 412
Job Number: 31595		Part Number: D412664145
Job Number: 		
Seq. #:	Machine Or Operation:	Description :
14.0	QC3	INSPECT POWDER COAT/CHEMICAL CONVERSION <i>2005-230</i>
15.0	QC5	INSPECT WORK TO CURRENT STEP <i>2005-230</i>
Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION		
16.0	OUTSIDE SERV.10	OUTSIDE SERVICES -LG 
Comment: INSPECT WORK TO CURRENT STEP		
17.0	PACKAGING 1	PACKAGING RESOURCE #1 
Comment: PACKAGING RESOURCE #1 Inspect for transit damage Ensure copy of NDT results attached to work order.		
18.0	QC5	INSPECT WORK TO CURRENT STEP <i>2005-310</i>
Comment: Inspect for damage & ensure results are as per Dwg D412-664-203		
19.0	SPRAY PAINTING	SPRAY PAINTING 
Comment: SPRAY PAINTING 1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 } 8107-06-04		
20.0	QC14	INSPECT SPRAY PAINT <i>2006-050</i>
Comment: Inspect Spray Paint Wrap in plastic bag to protect from scratches		

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 4/4/2007 8:58:40 AM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 31595

Part Number: D412664145

Job Number:



Seq. #: Machine Or Operation:

Description :

21.0 D31893 Chafing Shield



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Chafing Shield

Batch: 31656

BT 07-06-08

22.0 D3595 Rubber Cushion (per sq ft)



Comment: Qty.: 0.0798 sf(s)/Unit Total : 0.0798 sf(s)

Rubber Cushion

Cut to .630" X 4.4" X 4 PCS

Batch: 31948

BT 07-06-08

23.0 D28931 Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2893-1 Support 29524

BT 07-06-08

24.0 D2856600 Abrasion Strip



Comment: Qty.: 0.9450 f(s)/Unit Total : 0.9450 f(s)

Abrasion Strip

1X D2856 .250" X 8.42"

Batch: 36650

BT 07-06-08

25.0 MS2192022 Clamp(per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 MS21920-22 Clamp

N/A *optional.*
used -24 ↓

26.0 MS2192024 Clamp(per MIL-DTL-8783C)



Comment: Qty.: 6.0000 Each(s)/Unit Total : 4.0000 Each(s)

clamp(per MIL-DTL-8783C)

batch: 101810

BT 07-06-08

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: Date: 07/06/08
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 31595

Part Number: D412664145

Job Number:



Seq. #: Machine Or Operation:

Description:

27.0 LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Assemble as per Dwg D412-664-145

Install Chaffing Sheild

Instal supports with magnobond 6398 per dwg D412-664-245,
cure for 12hrs before packaging.

Time & date of application: 1200 07-06-07

Batch: 103628

27
07-06-07

28.0 QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

29.0 PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D412-664-105

*****Ensure tube is not packaged if curing time is less than 12 hrs, see step 26 for application time & date

Time & date of packaging: 7/6/08 12:30

POSITIVE RECALL

EFFECTIVE 07.04.04 AUTH 4

RELEASED H DATE 7/6/08

Location: _____

PPP Rev: _____

B 32178

30.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

7/6/08

Job Completion



Not done

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART

DESIGN	DRAWN BY	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED	APPROVED	DRAWING NO.	REV. B
		D412-664-145	SHEET 1 OF 3
DATE		TITLE	
07.03.01		CROSSTUBE ASS'Y (412 LOW-N FWD) NTS	
A	06.12.21	SCALE	
B	07.03.01	CHG RUBBER CUSHION	

PRELIMINARY ISSUE
9/07.04.01

PARTS LIST:

Qty	Part Number	Description
X	D412-664-145	CROSSTUBE ASSEMBLY (412 LOW-NARROW FWD)
1	D6019-128	CROSSTUBE
1	D2856-250-842	ABRASION STRIP
2	D2893-1	SUPPORT
1	D3189-3	CHAFING SHIELD
4	D3595-063-440	RUBBER CUSHION
2	MS21920-22	CLAMP
4	MS21920-24	CLAMP
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 124.48 ± 0.020 (BEFORE BENDING/TRIMMING)
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR MS21920-22 CLAMPS AND ASSOCIATED HARDWARE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-XXX-YYY ABRASION STRIPS WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-24 CLAMPS WITH D3595-063-440 RUBBER CUSHIONS TO SECURE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB.

SHOP COPY
RETURN TO
CROSSTUBE
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. *31595*

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DART AEROSPACE LTD	Work Order:	31595
Description: crosstube (low narrow FWD)	Part Number:	0412-664-145
Inspection Dwg:	Rev:	Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

First Article Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
2.740	+0.05 -0.00	2.742	✓			
2.490	"	2.493	✓			
2.557	"	2.560	✓			
2.624	"	2.628	✓			
2.692	"	2.696	✓			
2.750 (stock)		2.750	✓			
2.740	+0.05 -0.06	2.742	✓			
2.490	"	2.493	✓			
2.557	"	2.560	✓			
2.624	"	2.627	✓			
2.692	"	2.696	✓			
2.750 stock.		2.750	✓			
124.476		124.490	✓			

Measured by:	M8	Audited by:	DR	Prototype Approval:	
Date:	07/04/19	Date:	07/04/20	Date:	

Rev	Date	Change	Revised by	Approved
A		New Issue	KJ/JLM	

DART AEROSPACE LTD

Work Order:

31575

Description: Crosstube Low Narrow Fwd (412)

Part Number:

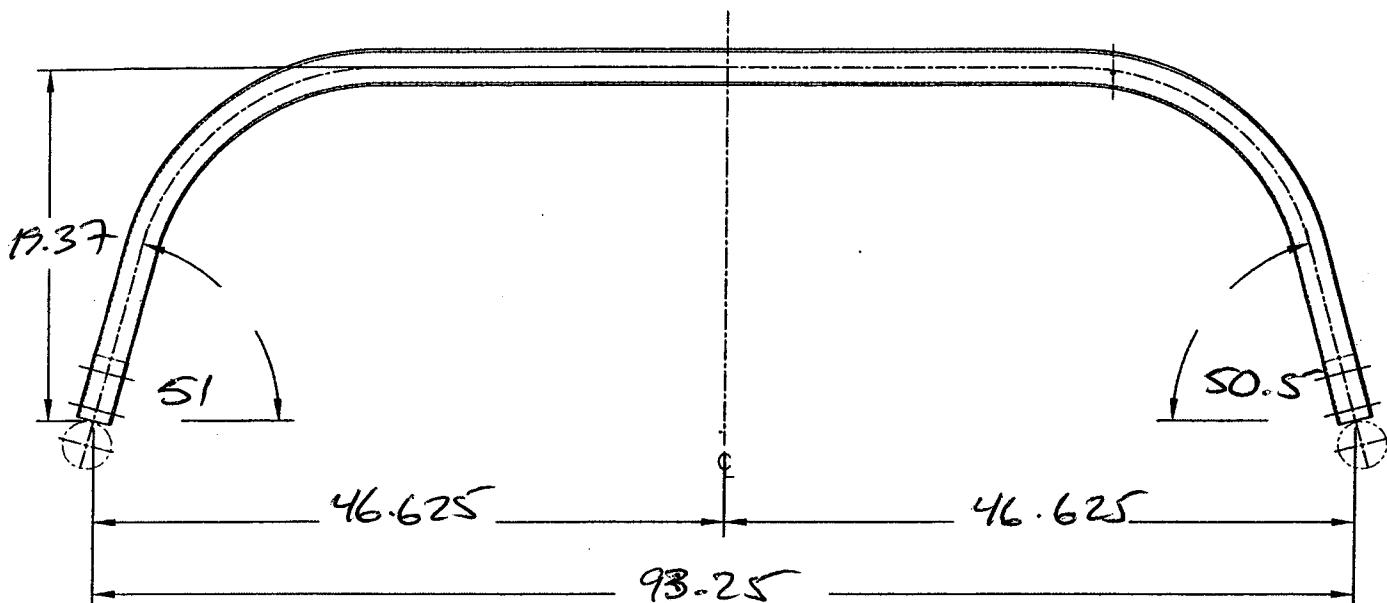
D412-664-105

Inspection Dwg: D412-664-145

Rev: C

Page 1 of 1

Required Dimension	Min	Max
Height	19.23	19.49
1/2 Span	46.47	46.73
Angle	49°	52°
Total Span	92.94	93.46



Comments

QC15 Inspection	<i>[Signature]</i>
Date	07.05.14

Rev	Date	Change	Revised by	Approved
A	07.04.27	New Issue	KJ/JM	



HeathAir

INTERNATIONAL (1991) INC.

681 Ave. Lepine, Dorval, Québec H9P 1G3
Tél.: (514) 636-1000 • Fax: (514) 636-0031

W.O. N° 36419

A.M.O. Number: 46/90

NON-DESTRUCTIVE TESTING REPORT

AIRCRAFT/COMPONENT INFORMATION

REGISTRATION:

MODEL/TYPE:

SERIAL NUMBER:

TOTAL HR/LDG:

OPERATED BY:

BASED AT:

INSPECTION REQUIREMENTS

Carry out FPI of seven (7) cross tubes (external surface) as per ASTM E-1417-05 and the Dart QSI 338, Section 4.1.1 (on file at client) - parts delivered to HeathAir.

Qty. (1) P/N D212-664-201 S/N B31360

Qty. (1) P/N D058-676-101 S/N B30250

Qty. (2) P/N D206-667-101 S/N's B29101 & B28680

Qty. (3) P/N D412-664-145 S/N's B31596, B31594 & B31595

RADIOGRAPHY

ULTRASONIC

PENETRANT

MAGNETIC PARTICLE

EDDY CURRENT

INSPECTION REPORT

Fluorescent penetrant inspection was performed in accordance with the above requirements on seven (7) cross tubes.

Note: A Level 3 penetrant was substituted for the requested Level 2 (3 is more sensitive)
Ardrox 970P25E Batch #04B503.

Five (5) cross tubes PASSED inspection and two (2) cross tubes FAILED inspection (P/N D212-664-201 S/N B31360 & P/N D058-676-101 S/N B30250).

THE MAINTENANCE DESCRIBED ABOVE HAS BEEN PERFORMED IN ACCORDANCE WITH
THE APPLICABLE STANDARDS OF AIRWORTHINESS

DATE May 31, 2007

INSPECTED BY: 

INSPECTION
STAMP(S) Not Required

CUSTOMER INFORMATION

CUSTOMER: Dart Aerospace

P.O. NUMBER

3825

ADDRESS:

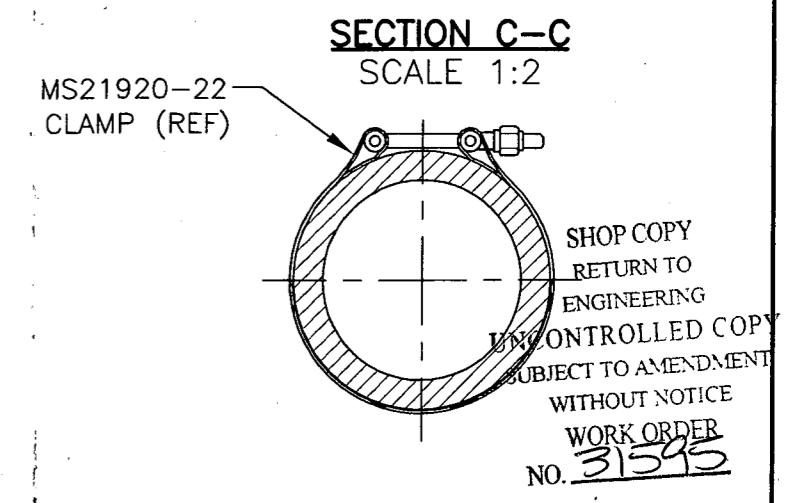
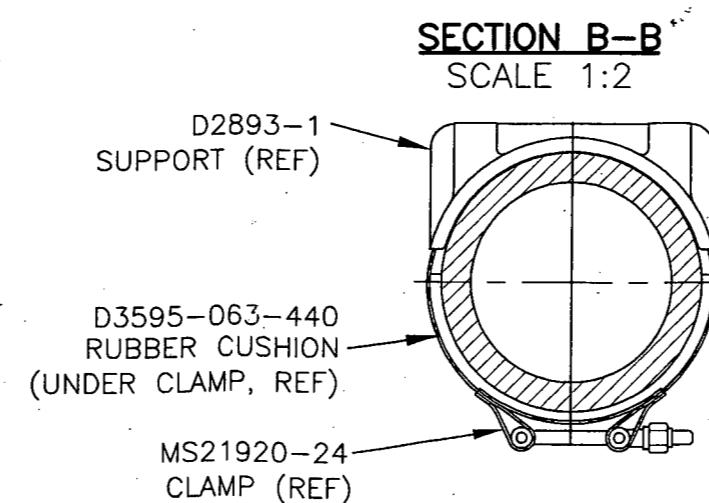
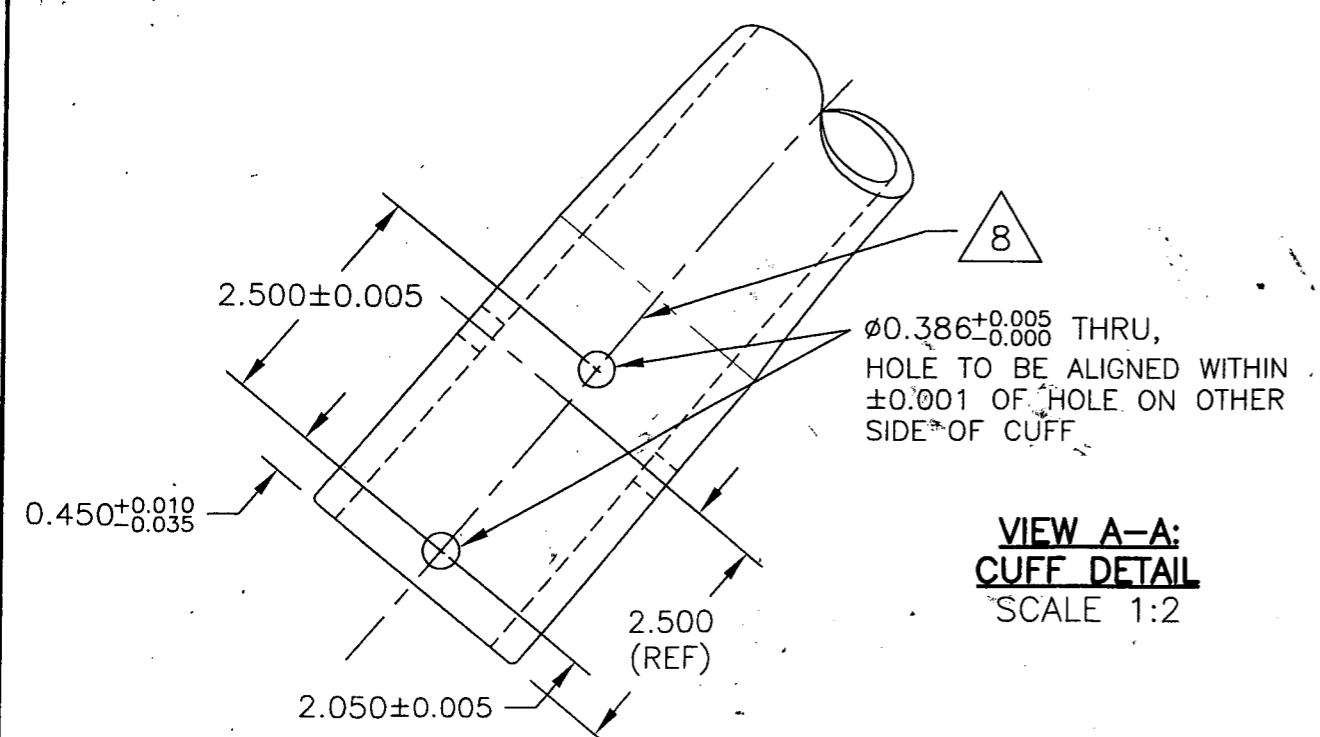
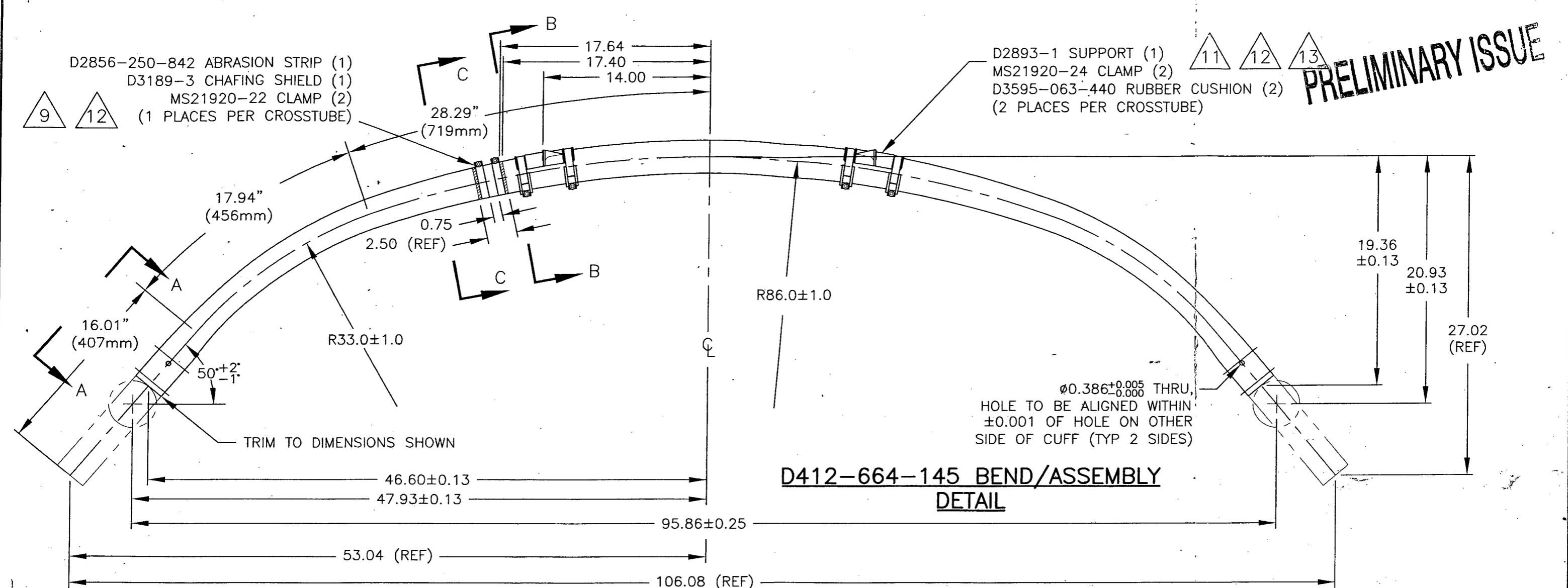
CONTACT NAME:

LABOUR	@	\$
MATERIALS	@	
TRAVEL EXPENSES	@	GST
HOTEL EXPENSES	@	PST

INVOICE NO.

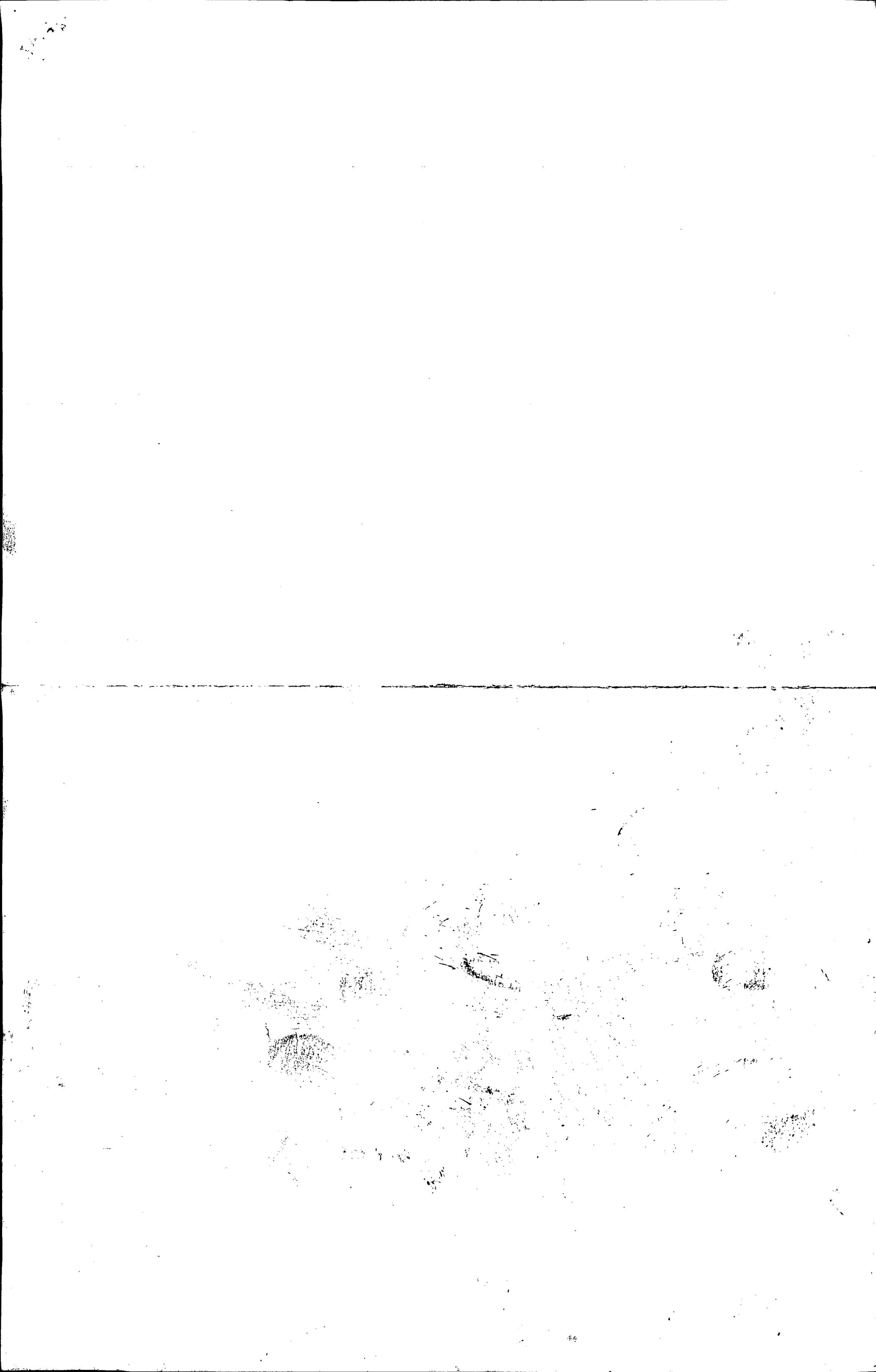
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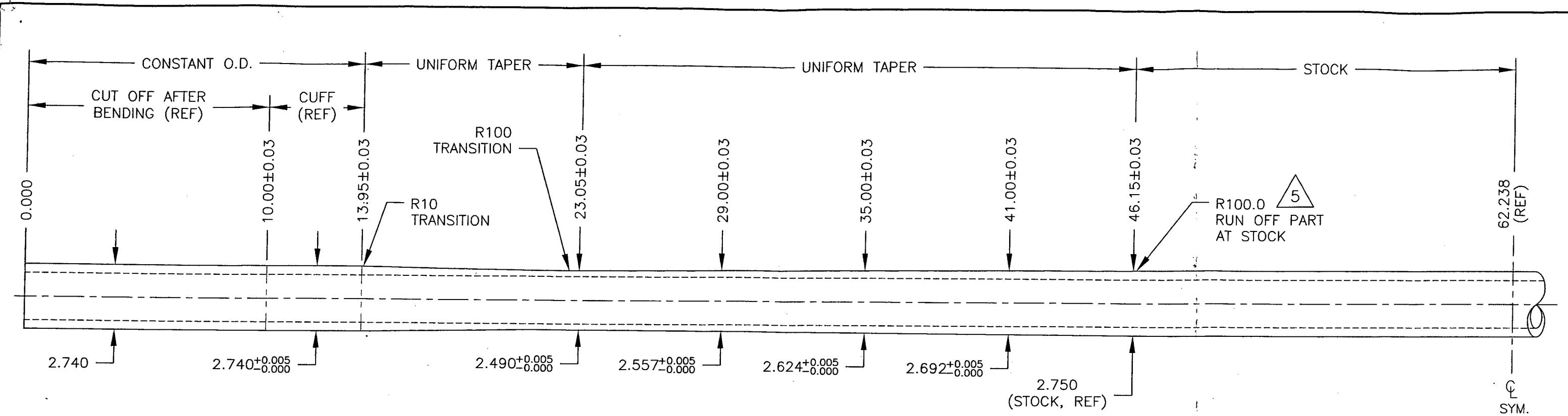
PRELIMINARY ISSUE



DESIGN	DRAWN BY	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
9P	9P	DART	REV. B
CHECKED	APPROVED		DRAWING NO. D412-664-145
DATE			SHEET 2 OF 3
07.03.01			TITLE CROSSTUBE (412 LOW-NARROW FWD) 1:8

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D412-664-145 MACHINING DETAIL

PRELIMINARY ISSUE

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NO. 31595

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DESIGN	DRAWN BY	DART AEROSPACE LTD.
<i>GP</i>	<i>GP</i>	DART HAWKESBURY, ONTARIO, CANADA
CHECKED	APPROVED	DRAWING NO.
<i>GP</i>	<i>GP</i>	D412-664-145
DATE		SCALE
07.03.01		CROSSTUBE (412 LOW-NARROW FWD) 1:4

